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required for reference. The reader can omit it, and refer to it as it becomes necessary for the understanding of later chapters."

Contents—Chapter I: Introduction, 1–8; II: The elementary properties of tangents and normals, 8–23; III: The curvature of plane curves, 24–44; IV: The theory of contact, 45–58; V: The theory of envelopes, 58–79; VI: Singular points of plane curves, 80–89; VII: Asymptotes of plane curves, 89–103.

NOTES.

The second edition of W. A. Robertson and F. A. Ross's *Actuarial Theory* (Edinburgh, Oliver and Boyd, 23 + 431 pages) appeared in the early summer of 1920. The changes in the first edition are mainly in the correction of errors.

The Oxford University Press announces the following books: *Roger Bacon and the State of Science in the Fourteenth Century* by R. Steele; *Archimedes' Principle of the Balance and some criticisms upon it* by J. M. Child; *A History of Greek Mathematics*, 2 volumes, by Sir Thomas Heath—The Cambridge University Press has published a third edition of E. T. Whittaker and G. N. Watson's *A Course of Modern Analysis* (8 + 608 pages; price 40 shillings). It contains about 230 pages more than the first edition by Whittaker alone.

The second part of the sixth volume of the *Encyklopädie der Mathematischen Wissenschaften* is devoted to Astronomy. Between 1905 and 1915 six Hefte were published; the last of these included Professor E. W. BROWN's "Theorie des Erdmondes," translated by A. v. Brunn. The first thirty-five pages of Heft 7, published in 1920, contain "Die Satelliten" by Professor KURT LAVES, of the University of Chicago. This section was "abgeschlossen im Sommer 1916." The rest of the Heft (pages 843–895) is devoted to "Bestimmung und Zusammenhang der astronomischen Konstanten" by J. Bauschinger.

In *Proceedings of the Benares Mathematical Society*, volume 2, 1920, D. K. Sen, research scholar in mathematics at Benares Hindu University, has an eleven page article entitled: "On the application of Burgess's method for determining the uniform motion of an ellipsoid of revolution through a viscous liquid along its axis of revolution." The reference here is to Professor R. W. Burgess's doctor's thesis at Cornell, on "The uniform motion of a sphere through a viscous liquid," published in the *American Journal of Mathematics*, 1916.

America's influence is being wielded in mathematics of the elementary and secondary schools of Cuba and South America through the works in Spanish by "Jorge Wentworth y David Eugenio Smith" published by the enterprising firm of Ginn and Company. These works are: *Geometría Plana y del de Espacio* (1915, 8 + 469 pp.; price $1.72; translation of the authors' English work), *Elementos de Algebra* (1917, 6 + 458 pp.; price $1.72; translation, with slight changes, of book 1 and part of book 2 of the authors' *School Algebra*), and *Aritmética Moderna*, 2 books (1916, 6 + 265 + 6 + 317 pp.; price $.64 + $.80; not an exact translation of any American editions).

From an editorial in *The New York Times*, October 3, 1920, on James Russell Lowell as a teacher at Harvard, with special reference to an article on this topic by W. R. Thayer: "Mr. Thayer describes and seems to wonder at Mr. Lowell's illimitable mustaches—frowning over a square beard. They were a work of art, nor can we understand why Mr. Thayer found them 'neither becoming nor beautiful.' There were barbate giants in those days. One remembers Professor BENJAMIN PEIRCE and his son, Professor JAMES MILLS PEIRCE, bearded both like the pard or the ball players of the House of David. Mr. James T. Fields, one of Mr. Lowell's publishers and his successor as editor of *The Atlantic*, had as copious and melodious a beard as ever inflamed a barber's eyes; at one time there were strange sausages or curls each side of the cheek."

The Göttingen *Nachrichten*, Mathematisch-physikalische Klasse for June, 1920, contains the first of a series of memoirs by G. H. Hardy and J. E. Littlewood in which they propose to develop in detail the new analytic method which they found for the discussion of Waring's problem and a number of allied problems in 'additiver Zahlentheorie.' The general lines of this method, in so far as it concerns Waring's problem in particular were explained in a recent paper in the *Quarterly Journal of Mathematics* [see this MONTHLY, *1920*, 272] where full references to the literature of the problem were given. The object of the authors now is "to give full details of the proofs, up to the point at which Hilbert's famous theorem, first proved in this journal in 1909, emerges as a corollary from our analysis." The Geschäftliche Mitteilungen of the *Nachrichten*, for July, 1920, contains sketches of the life and work of Woldemar Voigt [*1920*, 280], pages 45–52, by C. Runge, and of Adolf Hurwitz [*1920*, 191], pages 75–83, by D. Hilbert.

ARTICLES IN CURRENT PERIODICALS.

AMERICAN JOURNAL OF MATHEMATICS, volume 42, no. 3, July (published in October), 1920: "The failure of the Clifford chain" by W. B. Carver, 137–167; "On the representations of numbers as sums of 3, 5, 7, 9, 11 and 13 squares" by E. T. Bell, 168–188; "On a certain class of rational ruled surfaces" by A. Emch, 189–210.

BULLETIN DES SCIENCES MATHEMATIQUES, volume 55, June, 1920: Review by R. Garnier of O. Veblen and J. W. Young's *Projective Geometry*, volume 2 (Boston, 1918), 105–112 [Last paragraph: "Par ce rapide apercu on aura pu pressentir la variété des problèmes abordés, la rigueur des développements et l'importance des résultats établis. A ces qualités essentielles, le Traité joint tous les avantages d'une forme attrayante; rédigé dans un style clair et précis, complèté par un choix très étendu d' 'exercises'—dont quelques-uns, d'un niveau élevé, sont empruntés à de recents Mémoires—, l'Ouvrage de MM. Veblen et Young sera pour l'étudiant francais le plus sûr des initiateurs."]

BULLETIN OF THE AMERICAN MATHEMATICAL SOCIETY, volume 27, no. 1, October, 1920: "The Seattle meeting of the San Francisco section" by E. T. Bell, 1–4; "Note on a generalization of a theorem of Baire" by E. W. Chittenden, 5–6; "Certain iterative characteristics of bilinear operations" by N. Wiener, 6–10; "Necessary and sufficient conditions that a linear transformation be completely continuous" by C. A. Fischer, 10–17; "On the relation of the roots and poles of a rational function to the roots of its derivative" by B. Z. Linfield, 17–21; "Moritz Cantor, the historian of mathematics" by F. Cajori, 21–28; "Shorter notices," 28–38 [Reviews by D. E. Smith of A. Eymieu's *La Part des Croyants dans les Progrès de la Science au XIXe Siècle*, 3e éd. (Paris, 1920) and of J. M. Child's *Early Mathematical Manuscripts of Leibnig* (Chicago, 1920); reviews by R. D. Carmichael of A. N. Whitehead's *An Enquiry Concerning the Principles of Natural Knowledge* (Cambridge, 1919) and of H. Bateman's *Differential Equations* (London, 1918)]; "Notes," 39–46; "New publications," 46–48.